IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Surjit S. Chadha, et al.	Examiner:	Unknown
Serial No.	TBA	Group Art Unit:	Unknown
Filed:	Herewith	Paper No.	1
For:	BINDERS FOR FIELD EMISSION DISPLAYS		

Box PATENT APPLICATION
Assistant Commissioner for Patents
Washington, DC 20231

PRELIMINARY AMENDMENT

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

On page 1, before the Background of the Invention, please insert the following new paragraph:

--Cross-Reference to Related Application

This application is a continuation of copending U.S. patent application Serial No. 09/054,552 filed April 3, 1998, which is a divisional of U.S. Patent No. 5,744,907 issued April 28, 1998, the entirety of which is incorporated herein by reference. --.

Please replace the paragraph beginning on page 1, line 10 with the following replacement paragraph:

Field emission display (FED) technology utilizes a matrix addressable array of pointed, thin film, cold field emission cathodes in combination with a phosphor luminescent screen, as represented for example by U.S. Patent No. 5,210,472, the

disclosure of which is incorporated herein by reference. An emissive flat panel display operates on the principles of cathodoluminescent phosphors excited by cold cathode field emission electrons. A faceplate having a cathodoluminescent phosphor coating, similar to that of a cathode ray tube, receives patterned electron bombardment from an opposing baseplate thereby providing a light image which can be seen by a viewer. The faceplate is separated from the base plate by a narrow vacuum gap. Arrays of electron emission sites (emitters) are typically sharp cones on the cathode that produce electron emission in the presence of an intense electric field. A positive voltage is applied to an extraction grid, relative to the sharp emitters, to provide the intense electric field required for generating cold cathode electron emission. Prior art Figure 1 is a photocopy of Figure 1 of the above-referenced U.S. Patent No. 5,210,472. Figure 1 shows a perspective view of the baseplate of a field emission display. As shown, the baseplate includes a plurality of base electrode strips 12A-12C, and a plurality of grid electrode strips 11A-11C. A plurality of field emission cathodes, or emitters, 13 are disposed on the base electrode. The tip of each emitter is surrounded by a grid strip aperture 14. In operation, voltages applied to the base electrode and the grid electrode cause selected emitters to emit electrons that travel towards a faceplate.

On page 3, line 7, before the Detailed Description of an Illustrative Embodiment, please insert the following new paragraphs:

-- BRIEF DESCRIPTION OF FIGURES

Figure 1 shows a perspective view of the baseplate of a prior art field emission display;

Figure 2 shows a block diagram of a field emission display constructed according to the invention. --

On page 5, line 16, please insert the following new paragraph:

--Figure 2 shows a block diagram of a portion of a field emission display 100. Display 100 includes a baseplate 110 of the type shown in Figure 1 having conical emitters. Display 100 also includes a faceplate 120. Faceplate 120 includes a glass screen 122. As stated above, the screen 122 is normally coated with a transparent conducting film 124 such as ITO. Faceplate 120 also includes a layer 126 of phosphor and binder material. The binder material holds the phosphor particles together as well as to the faceplate. --

IN THE CLAIMS:

Please cancel claims 1-9 and 11-12 without prejudice.

Please also replace claims 10 (page 7, line 16) and 14 (page 8, line 12), as amended below, and add new claims 20-21 as follows:

10. A method for forming an improved field emission display device, comprising the steps of:

providing a screen; and

depositing phosphor material and a binder on said screen, said binder material holding said phosphor material to said screen, said binder material comprising a conductive material.

14. A method according to claim 10 wherein said binder material is selected from the group including: poly(propylene carbonate), poly(propylene carbonate) and poly(ethylene Carbonate).

20. (New) A method for forming a field emission display device, comprising:

providing a faceplate comprising a transparent screen having at least one side;

applying a transparent conductor to said side of said screen;

applying a layer of phosphor and conductive binder material to said transparent conductor, said binder material holding said phosphor to said transparent conductor;

providing a baseplate comprising;

a base electrode;

a plurality of conical field emission cathodes having a base and a tip, the bases of said field emission cathodes being disposed on said base electrode; and

a grid electrode disposed proximal the tips of said field emission cathodes;

positioning the baseplate proximal said side of said screen so that said baseplate is spaced apart from said faceplate;

providing a vacuum gap between said faceplate and said baseplate.

21. (New) A method for forming a field emission display device, comprising:

providing a faceplate comprising a transparent screen having at least one side;

applying a transparent conductor to said side of said screen;

applying a layer of phosphor and semiconductive binder material to said transparent conductor, said binder material holding said phosphor to said transparent conductor;

providing a baseplate comprising:

a base electrode

a plurality of conical field emission cathodes having a base and a tip, the bases of said field emission cathodes being disposed on said base electrode; and

a grid electrode disposed proximal the tips of said field emission cathodes;

positioning the baseplate proximal said side of said screen so that said baseplate is spaced apart from said faceplate;

providing a vacuum gap between said faceplate and said baseplate.

IN THE DRAWINGS:

Please add the enclosed new Figures 1 and 2.

IN THE ABSTRACT:

Please replace the paragraph on page 10, line 1 with the following replacement paragraph:

Conductive or semiconductive binders, both inorganic and organic, are used for providing sufficient binding action to hold powder phosphor particles together as well as to the glass screen of a field emission display device.

REMARKS

The specification and drawings have been amended to reflect corresponding amendments made to the priority and parent applications.

Claims 10 and 13-21 are pending, of which claims 10, 20 and 21 are independent. Claims 10 and 14 have been amended and new claims 20-21 have been added.

Claims 10, and 13-21, the remaining claims in the application, are believed to be allowable. An early and favorable examination is earnestly solicited. If there are any remaining issues, the Examiner is urged to contact the undersigned at the telephone number indicated below.

No fees are believed to be due in connection with this paper. However, please charge any fees, or credit any overpayment, that may be due in connection with this paper to our deposit account no. 08-0219. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

Date: Dec. 3, 2002

Richard A. Goldenberg
Registration No. 38,895
Attorneys for Applicants

Hale and Dorr LLP
60 State Street
Boston, MA 02109
617-526-6548 (telephone)
617-526-5000 (facsimile)

VERSION OF AMENDED SPECIFICATION PARAGRAPH WITH CHANGES INDICATED

Paragraph beginning on page 1, line 10.

Field emission display (FED) technology utilizes a matrix addressable array of pointed, thin film, cold field emission cathodes in combination with a phosphor luminescent screen, as represented for example by U.S. Patent No. 5,210,472, the disclosure of which is incorporated herein by reference. An emissive flat panel display operates on the principles of cathodoluminescent phosphors excited by cold cathode field emission electrons. A faceplate having a cathodoluminescent phosphor coating, similar to that of a cathode ray tube, receives patterned electron bombardment from an opposing baseplate thereby providing a light image which can be seen by a viewer. The faceplate is separated from the base plate by a narrow vacuum gap. Arrays of electron emission sites (emitters) are typically sharp cones on the cathode that produce electron emission in the presence of an intense electric field. A positive voltage is applied to an extraction grid, relative to the sharp emitters, to provide the intense electric field required for generating cold cathode electron emission. Prior art Figure 1 is a photocopy of Figure 1 of the above-referenced U.S. Patent No. 5,210,472. Figure 1 shows a perspective view of the baseplate of a field emission display. As shown, the baseplate includes a plurality of base electrode strips 12A-12C, and a plurality of grid electrode strips 11A-11C. A plurality of field emission cathodes, or emitters, 13 are disposed on the base electrode. The tip of each emitter is surrounded by a grid strip aperture 14. In operation, voltages applied to the base electrode and the field electrode cause selected emitters to emit electrons that travel towards a faceplate.

MARKED-UP VERSION OF CLAIMS WITH CHANGES INDICATED

Amended claim 10 at page 7, line 16.

10. (Amended). A method for forming an improved field emission display device, comprising the steps of:

[providing a transparent anode;]

providing a screen; and

depositing phosphor material and a binder on said [anode] screen, said binder material holding said phosphor material to said screen, said binder material comprising a conductive material. [; and

applying binder material to said anode and phosphor material, whereby the phosphor material is bound together and to said anode so that shedding of said phosphor material is substantially eliminated.]

Amended claim 14 at page 8, page 12.

14. (Amended). A method according to claim 10 wherein said binder material is selected from the group including: poly(propylene carbonate), poly(propylene carbonate) and poly(ethylene Carbonate) [sold by PAC Polymers Inc. of Greenville, DE as QPAC-40 Emulsion, QPAC-40 and QPAC-25, respectively].

MARKED-UP VERSION OF ABSTRACT WITH CHANGES INDICATED

Paragraph beginning on page 10, line 1.

Conductive or semiconductive [B]binders, both inorganic and organic, are used for providing sufficient binding action to hold powder phosphor particles together as well as to the glass screen of a field emission display device.